

REMARKS

Claims 1-34 are currently pending, of which claims 1-7, 11-13, 15-22, 24, 25, and 29-35 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,499,364 to Klein et al. (hereinafter, "Klein"). Applicant appreciates the indication that claims 8-10, 14, 23, and 26-28 are allowable. Claim 35 has been canceled. For at least the reasons set forth hereunder, Applicant traverses the rejections of claims 1-7, 11-13, 15-22, 24, 25, and 29-34 and, therefore, requests reconsideration thereof.

Recapitulation of the Invention¹

The invention relates to a controller to control operation of an agent that is part of a multi-agent distributed control system. Distributed control systems may be classified as either agent based or non-agent based. In multi-agent distributed control systems, the agents share many similarities with one another in terms of their operation. That is, the agents typically include programs that define their behavior as an agent or member of the control system. These programs can be generally characterized as governing standard agent-type functionality for each of the agents. However:

Because different processes employ a wide variety of specific machines, and because the particular machines of any given process can also differ greatly from one another, it is impossible to cost-effectively develop a single, standard agent that would be capable of interacting with any and every arbitrary machine of any and every given system. In particular, the control programs or algorithms governing different machines can vary greatly from one machine to another. (¶9).

In non-agent distributed control systems, the controllers are programmed with programs that govern application-specific functionality. In one form, these programs take the form of "ladder logic programs". Such ladder logic programs are designed "to govern the relationships between the controllers and the specific machines assigned to be controlled by those controllers, but are not generally intended to govern high-level interactions between the multiple controllers of the distributed control system." (¶10).

¹ This Section is intended to provide the Examiner with some background information on the state of the art and applicant's contribution to it. It is not intended to distinguish specific claims from the prior art.

Thus, in a simplified characterization, conventional agent-based controllers have programs that govern agent-type functionality and non-agent based controllers have programs that govern application-specific functionality. Yet, the programs of the agent-based controllers do not govern application-specific functionality and the programs of the non-agent based controllers do not provide agent-type functionality. As such, in one embodiment, the present invention includes a controller having a first program portion for commanding a controlled device, a second program portion capable of governing standard agent-type functionality, and a third program portion capable of governing application-specific agent-type functionality.

Rejection under 35 U.S.C. §102(b)

Claims 1-7, 11-13, 15-22, 24, 25, and 29-34 stand rejected as being anticipated by Klein. To support a rejection under 35 U.S.C. §102, the Examiner must show that the reference teaches each and every element recited in the claims. See MPEP §2131. As explained in greater detail below, Klein does not teach a controller having “a third program portion capable of governing application-specific agent-type functionality.”

Klein describes a system and method for optimizing message flows between agents in distributed computations. In this regard, Klein describes a system whereby each agent of the distributed control system “maintains a store of local knowledge concerning the state variables in other agents and uses that local knowledge store to determine when messages that would normally be sent to other agents can be omitted or delayed.” (1:9-14). Klein further describes its invention as being “based on the concept that many possible message optimizations in a distributed computation system whose protocols are determined at run time would require knowledge of the status of events associated with the distributed computation and also require each agent to have some knowledge of the event/condition rules used by other ones of the agents.” (2:61-67). In other words, Klein describes each controller as having a program to govern standard agent-type functionality.

For example, Klein, as referenced above, describes each agent as having a local knowledge database. Klein describes the local knowledge database as follows:

The local knowledge database 184 for a particular agent includes a control block 210 that stores the agent's identifier 212, which is a unique identifier assigned to the agent upon creation of the agent by the transaction manager 130, and the agent's current state 214. The database 184 further more includes an event table 220 that stores information concerning "events", where each event either identifies a state transition triggered by the agent itself, in which case the event is called a local event, or a state transition triggered by another agent, which is called an external event. To coordinate the execution of a set of agents, constraints (also called dependencies) are created among different events. Each dependency defines a condition on the occurrence or non-occurrence of an event in a particular agent. For each event that is relevant to an agent's execution, the agent maintains a list of conditions and a list of notifications. Upon the receipt of a notification that an event has occurred or a notification that an event has not and will not occur, an agent resolves all those conditions which refer to the event. (7:14-33).

Thus, the local knowledge database stores event data (for local and external events) "that is relevant to the operation of the agent in which the database 184 is located" (7:55-56) relative to other agents in the distributed system. More particularly, the controllers described by Klein use the local knowledge database to govern how the agents communicate with one another within the distribution. One skilled in the art of distributed control systems would characterize such a local knowledge database and the associated programming as governing standard agent-type functionality. The programming disclosed by Klein for a controller does not govern the application for which the controller is used.

The Examiner references that Klein teaches that each agent has "an application program 120"; however, the application program "implements the state machine for the agent." (4:45-49). That is, the application program governs how the agent behaves as a member of the distributed system; it does not govern how the agent performs the application for which it is configured to perform.

Contrastingly, the present disclosure, as defined by claim 1, is directed to a controller configured to operate an agent and includes program portions that govern agent-type functionality as well as application-specific agent-type functionality. In another example, claim 25 is directed to a distributed control system that includes controllers having application-specific control programs and agent-related programs. Claim 29 is directed to a configuration device that includes, in part, a storage medium containing application-specific

agent program portion and an application-specific control program portion. As detailed in the preceding paragraphs, Klein describes agents having programs to only govern agent-type functionality. Klein does not describe or otherwise teach application-specific agent-type or agent related programs, as recited in claims 1, 25, and 29. As such, the Examiner has failed to establish that the reference discloses each and every element recited in claims 1-7, 11-13, 15-22, 24, 25, and 29-34.

For at least these reasons, and as no other issues remain outstanding, Applicant requests timely issuance of a Notice of Allowance for claims 1-34.

The Commissioner is hereby authorized to charge any fees arising as a result of this or any other communication to Deposit Account 50-1170.

Applicant encourages the Examiner to contact the undersigned with any questions regarding this matter to expedite the prosecution of this application.

Respectfully submitted,

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